

Types 1808 and 1808A Pilot-Operated Relief Valves or Backpressure Regulators



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Fisher® backpressure regulators or relief valves must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Emerson Process Management Regulator Technologies, Inc. instructions.

If a leak develops or if the outlet continually vents gas, service to the unit may be required. Failure to correct trouble could result in a hazardous condition. Only a qualified person must install or service the unit.

Call a gas service person to service the unit. Only a qualified person must install or service the regulator.

Introduction

Scope of the Manual

This manual provides installation, adjustment, maintenance, and parts ordering information for Types 1808 and 1808A pilot-operated relief valves or backpressure regulators. The manual also includes coverage of the Types 6358 and 6358B pilots and, if used, a P590 Series filter. Instructions and parts lists for other equipment used with these regulators are found in separate manuals.

Description

Types 1808 globe-body and 1808A angle-body, pilot-operated backpressure regulators or relief valves



W3716

TYPE 1808 GLOBE-BODY



W3507

TYPE 1808A ANGLE-BODY

Figure 1. Types 1808 and 1808A Pilot-Operated Relief Valves or Backpressure Regulators

are economical, compact devices used in either gas or liquid service to maintain pressure on oil and gas separators and in pressure relief applications in gas distribution systems. The Type 6358 pilot is used in backpressure regulation and pressure relief applications throughout the oil and gas production industry, and is used in either gas or liquid service. Pressure relief and liquid service applications in



Types 1808 and 1808A

Specifications

Body Size and End Connection Style
2 NPT

Maximum Relief (Inlet) Pressure⁽¹⁾
150 psig (10,3 bar) including buildup

Set Pressure Ranges
See Table 1

Differential Pressures
Maximum: 125 psig (8,6 bar)
Minimum: 5 psig (0,34 bar)

Type 6358 Pilot Bleed
Bleeds only when repositioning the main valve

Type 6358B Pilot Bleed
Continuously bleeds while inlet pressure is above set pressure

Flow and Sizing Coefficients
See Table 2

Pressure Registration

Internal (**standard**) or External (optional)

Pilot Tubing and Connections

1/4 NPT with or without P590 Series filter

Temperature Capabilities⁽²⁾

-20° to 180°F (-29° to 82°C)

Approximate Weights

Type 1808: 22 pounds (10 kg)

Type 1808A: 25 pounds (11 kg)

Options

- Upstream control line construction
- Pressure gauge (0 to 160 psig/0 to 11,0 bar/ 0 to 1,1 MPa)
- P590 Series Pilot Supply Filter

1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

Table 1. Types 6358 and 6358B Set Pressure Ranges, Pressure Ratings, and Pilot Spring Information

SET PRESSURE RANGES, PSIG (bar)	PILOT SPRING INFORMATION			
	Part Number	Color	Wire Diameter, Inches (mm)	Free Length, Inches (mm)
3 to 18 (0,21 to 1,2)	1B986027212	Green	0.120 (3,05)	2.12 (54,0)
15 to 40 (1,0 to 2,8)	1E392527022	Yellow	0.148 (3,76)	2.00 (51,0)
35 to 125 (2,4 to 8,6)	1K748527202	Red	0.192 (4,88)	2.19 (55,6)

Table 2. Types 1808 and 1808A Flow Coefficients

TYPE	FLOW COEFFICIENTS (WIDE-OPEN)		K_m	C_1	IEC SIZING COEFFICIENTS		
	C_g	C_v			X_T	F_D	F_L
1808	1410	40.1	0.79	35.2	0.78	0.50	0.89
1808A	1800	51.4	0.76	35.0	0.78	0.50	0.87

the oil and gas industry are typically handled by the Type 6358B pilot. With either pilot, the set pressure is varied to individual requirements by the adjusting screw on the pilot. Pilot exhaust can be piped into the downstream line or vented into the atmosphere on gas service and should be piped downstream or to a safe location on liquid service.

diameter is indicated by a letter stamped on the bottom of the pilot body next to the tapped side outlet: an H for the yellow high-gain restriction and an L for the blue low-gain restriction. The pilot spring range appears on the pilot spring case.

Specifications

The Specifications section provides ratings and specifications for Types 1808 and 1808A relief valves or backpressure regulators. Some of the specifications for a given unit as it comes from the factory appear on the nameplate attached to the upper diaphragm case. The Type 6358B pilot restriction

Principle of Operation

A pressure relief valve is a control device that opens to relieve fluid to atmosphere during an overpressure occurrence. A backpressure regulator is a control device that maintains a constant upstream pressure throughout a given flow range. It functions in the same manner as a relief valve that opens on increasing upstream pressure. **The Type 1808 or 1808A cannot be used as an ASME safety relief valves.**

Types 1808 and 1808A

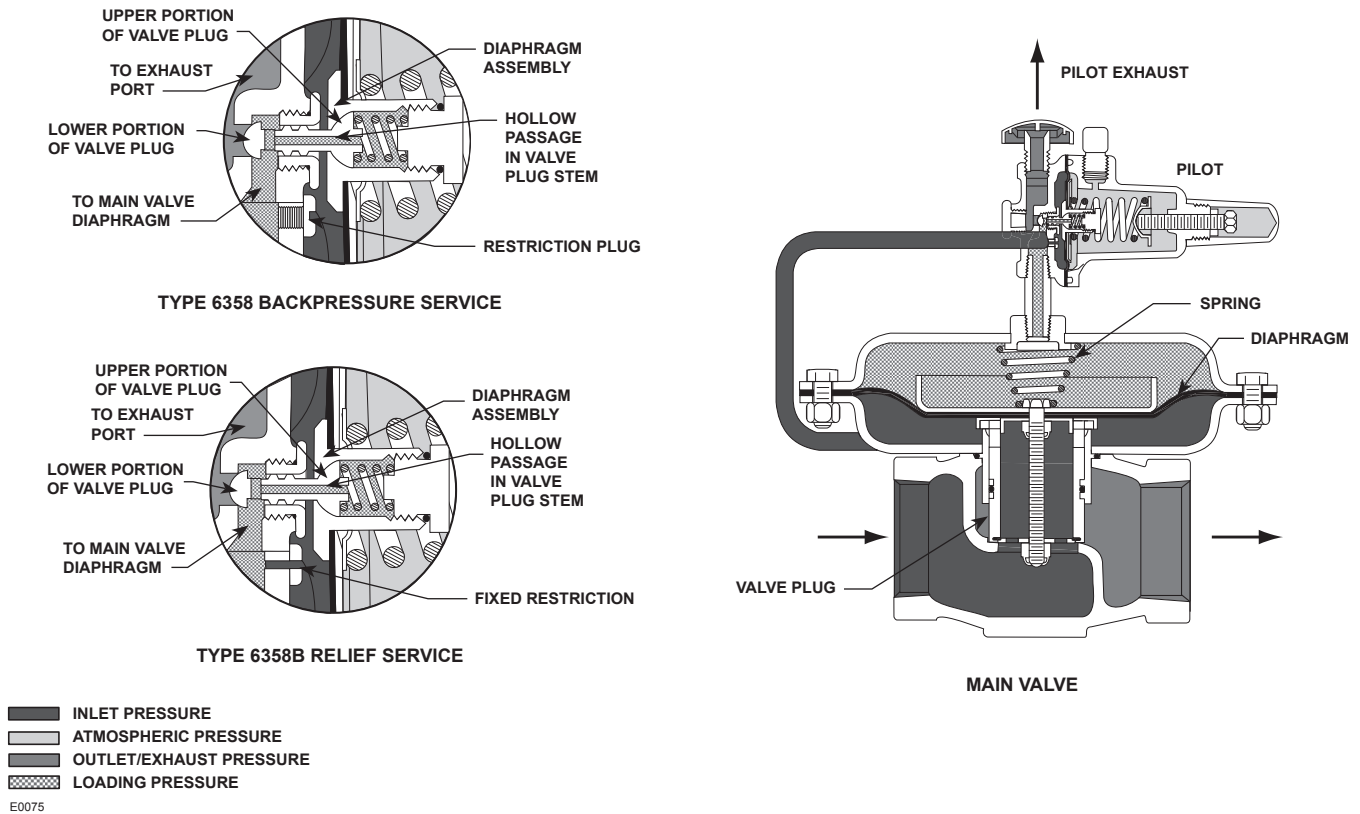


Figure 2. Type 1808 with 6358 Series Operational Schematics

Relief Valve

As long as the inlet pressure is below set pressure, the pilot control spring keeps the valve plug closed. Inlet pressure passes through the pilot restriction and registers as loading pressure on top of the diaphragm. Force from the main spring, in addition to inlet pressure bleeding through the pilot restriction, provide downward loading pressure to keep the main valve closed.

When the inlet pressure rises above the set pressure, the pressure on the pilot diaphragm overcomes the pilot control spring and opens the pilot valve plug. The pilot then exhausts the loading pressure from the top of the main valve diaphragm. The pilot continuously exhausts gas when the inlet pressure is above the set pressure. The inlet pressure unbalance overcomes the main spring force and opens the main valve.

As the inlet pressure drops, the pilot control spring begins to close the pilot valve plug and the exhaust slows. This causes the inlet pressure to build in the main valve diaphragm casing, allowing the control spring to close the main valve. Once the main valve is closed, the pilot valve plug closes and the exhaust stops.

Backpressure Regulator

As long as inlet pressure remains below setpoint, the pilot spring keeps the valve plug closed. Inlet pressure passes through the upper port around the upper portion of the valve plug then through the hollow passage in that valve plug. Force from the main spring, along with inlet pressure bleeding through the pilot, provide downward loading pressure to keep the main valve closed.

When inlet pressure rises above the set pressure, pressure on the pilot diaphragm overcomes the control spring to close the upper port and stroke the valve plug to open the lower port. The pilot then exhausts loading pressure from the top of the main valve diaphragm. The pilot exhausts only while repositioning the main valve. The inlet pressure unbalance overcomes the spring force and opens the main valve.

As the inlet pressure drops, the pilot control spring begins to close the pilot valve plug and the exhaust slows. This causes the inlet pressure to build in the main valve diaphragm casing, allowing the control spring to close the main valve. Once the main valve is closed, the pilot valve plug closes and the exhaust stops.

Types 1808 and 1808A

Installation



WARNING

Installing a Type 1808 or 1808A where its capabilities can be exceeded or where proper operation might be impaired may cause personal injury, property damage, or leakage due to bursting of pressure-containing parts or explosion of accumulated gas or liquid. To avoid such conditions, install the Type 1808 or 1808A backpressure regulator or relief valve where service conditions are within the unit capabilities given in the Specifications section and unit is protected from exposure to physical damage and/or corrosive substances.

1. When installing the relief valve or backpressure regulator, make sure that the system installation complies with applicable local, state, and federal codes and regulations.
2. Use qualified personnel when installing, operating, and maintaining the relief valve or backpressure regulator. Before installing the unit, inspect the main valve body, pilot, and pipelines for any damage or foreign material that may have collected. Apply pipe compound to the external pipeline threads only. Do not use pipe compound on any internal threads.
3. The relief valve or backpressure regulator may be installed in any position as long as pipeline flow complies with the flow arrow on the main valve body (Type 1808) or runs in through the bottom connection and out the side connection (Type 1808A). Superior performance may be obtained by disconnecting the pilot supply tubing from the elbow (key 36, Figures 3 and 4), removing the elbow, installing 1/4 NPT pipe plug into the lower casing (key 2), and connecting the pilot supply tubing to an upstream location.



WARNING

Types 1808 and 1808A relief valves or backpressure regulators vent gas or liquid from the main valve outlet, pilot exhaust, and pilot vent. In hazardous or flammable gas or liquid service,

personal injury or property damage may occur due to fire or explosion of vented gas or liquid that has accumulated.

To prevent such injury and damage, provide piping or tubing to vent the gas to a well ventilated location. Also, when venting a hazardous gas or liquid, piping or tubing should be located far enough from any buildings or windows so as not to create a further hazard.

Protect the main valve body, pilot exhaust, and pilot spring case vent against anything that could clog them. For safety during shutdown of backpressure regulators, install vent valves immediately upstream and downstream of the main valve.

4. The pilot exhaust may be piped directly into the main valve outlet (if the exhaust is to be retained, as in liquid service) or vented to the atmosphere. In either case, the diameter of the exhaust line or stack should be as large as practical with a minimum number of bends or other restrictions. When installing this unit in relief service, be sure to consider the jet thrust effect that will occur when it relieves.

Overpressure Protection

Relief ranges are from 3 to 125 psig (0,21 to 8,6 bar). The individual spring range of your relief valve is stamped on the nameplate.

Maximum inlet pressures depend upon body material and temperature. See the Specifications section for the maximum inlet pressure of the valve. The valve should be inspected for damage after any overpressure condition.

Startup

1. With installation completed, slowly open the upstream shut-off valve while using a gauge to monitor inlet pressure. On backpressure applications using an isolating bypass, open the downstream shut-off valve, and close the bypass valve.
2. If set pressure adjustment is necessary, adjust a Type 6358 or 6358B pilot by following the procedures in the adjustment section.

Adjustment



WARNING

The allowable spring range is stamped on the nameplate. If a pressure setting beyond the indicated range is required, substitute the appropriate spring. Be sure to label the valve to indicate the new pressure range.

Always use a pressure gauge to monitor pressure when making adjustments. Remove the closing cap (key 12, Figure 6) then loosen the locknut (key 11). To increase the setting, turn the adjusting screw (key 10) clockwise. Turn the adjusting screw counterclockwise to decrease the setting. Tighten the locknut to maintain position and install closing cap.



WARNING

To avoid personal injury or equipment damage, never adjust the pilot control spring to produce a set pressure higher than the upper limit of the set pressure range for that particular spring.

Set pressure is defined as the pressure at which the pilot starts to discharge. Each unit is factory-set for the set pressure specified on the order. If no set pressure is specified, the unit is factory-set at approximately the midrange of the spring.

Shutdown

Relief Installations

Slowly close the upstream shut-off valves. Release all pressure from the main valve and pilot by opening a vent valve. When all pressure has been released, tighten the fitting.

Backpressure Installations

Slowly close the upstream shut-off valve while opening the bypass valve if an isolating bypass is used. Then close the downstream shut-off valve, and open both vent valves to release all pressure from the main valve and pilot.

Maintenance

Parts are subject to normal wear and must be inspected and replaced as necessary. Frequency of inspection and maintenance depend upon severity of service conditions. The main valve body need not be removed from the line prior to maintenance.



WARNING

Avoid personal injury or property damage from sudden release of pressure or explosion of accumulated gas. Before starting disassembly, isolate the relief valve or backpressure regulator from line pressure, release trapped pressure from the body and any isolated piping, and vent any trapped loading pressure.

Main Valve

This procedure is performed when inspecting, cleaning, or replacing any main valve parts. Key numbers are referenced in Figures 3 and 4.

Note

If the trim is to be inspected and no further maintenance is required, it is unnecessary to remove the pilot from the upper casing (key 1) or separate the upper casing from the lower casing (key 2).

Disassembly

1. Remove the two hex nuts (key 18) from the cap screws (key 17) that hold the lower casing (key 2) to the body (key 8).
2. Lift the lower casing away from the body.
3. With the lower casing positioned so that the valve plug (key 6) is accessible, remove the hex nut (key 14).
4. Remove the O-ring retainer (key 7), the valve plug (key 6), the O-rings (keys 9, 10, and 11), and the back-up rings (key 19).
5. Inspect the O-rings and back-up rings, and replace as necessary. Check all parts for wear.
6. If no further maintenance is required, proceed to steps 5 through 8 of the Assembly section. If maintenance inside the casings is required, proceed with the following steps.

Types 1808 and 1808A

7. Disconnect the pilot tubing, and unscrew the pilot from the upper casing (key 1).
8. Remove the cap screws (key 15) and the hex nuts (key 16) holding the upper casing (key 1) and the lower casing (key 2) together.
9. Lift off the upper casing, and remove the spring (key 12).
10. Remove the upper hex nut (key 14) holding the upper diaphragm plate (key 4), lower diaphragm plate (key 5), and diaphragm (key 3) together. Slide the upper and lower diaphragm plates and the diaphragm off the cap screw (key 13).

Assembly

1. Assemble the upper diaphragm plate (key 4), the diaphragm (key 3), and the lower diaphragm plate (key 5) on the cap screw (key 13).
2. Tighten the upper hex nut (key 14) against the lower diaphragm plate (key 5) with approximately 5 to 7 foot-pounds (6,8 to 9,5 N•m) of torque.
3. Position the diaphragm so that its holes align with those in the lower casing (key 2).
4. Fit the upper casing (key 1) in place, and install the cap screws (key 15) and hex nuts (key 16). Tighten the hex nuts in a crisscross pattern with approximately 15 foot-pounds (20 N•m) of torque.
5. Install the O-rings (keys 9, 10, and 11) and back-up rings (key 19) into place on the valve plug (key 6). Slide the valve plug (key 6) and O-ring retainer (key 7) over the cap screw (key 13).
6. Tighten the hex nuts (key 14) against the O-ring retainer with approximately 5 to 7 foot-pounds (6,8 to 9,5 N•m) of torque.

Note

Before performing step 7, it is recommended that the gaskets (key 21) be replaced.

7. Fit the lower casing into the valve body, aligning the cap screws (key 17) with the holes in the body. Tighten the hex nuts (key 18) using approximately 20 foot-pounds (27 N•m) of torque.
8. Replace the pilot and tubing, if removed.
9. When all maintenance is complete, perform the Startup procedure if the unit will immediately be returned to service.

Types 6358 and 6358B Pilots

This procedure is performed if inspecting or replacing any pilot parts. Key numbers are shown in Figure 6.

Note

All pilot maintenance may be performed with the pilot body (key 1) attached to the pipe nipple unless the body is removed or the entire pilot replaced as a unit. If only the control spring (key 7) or spring seat (key 8) needs to be replaced, perform only steps 1, 2, and 6 below.

1. Remove the closing cap (key 12), loosen the locknut (key 11), and turn the adjusting screw (key 10) counterclockwise to remove the spring compression.
2. Remove the machine screws (key 17), spring case (key 2), control spring (key 7), and spring seat (key 8) from the body.
3. Remove the connector cap and gasket from the top of the diaphragm assembly (key 5), and then remove the valve spring (key 14). Unclip the E-ring (if used) and remove the diaphragm assembly. Remove the stem guide (key 9) to gain access to the valve plug (key 4) and the O-ring (key 37), if used.
4. Make sure the restriction or restriction plug (key 20), registration hole, and valve plug seating surfaces are free from debris. Inspect and replace parts as necessary, making sure that the restriction or restriction plug and valve plug (key 4) are installed, and then secure the valve plug with the stem guide (key 9). With a Type 6358 pilot, coat the restriction plug threads with a good quality sealant before installation.
5. Install the diaphragm/plate/connector portion of the diaphragm assembly (key 5), clip the E-ring (if used) to the grooved end of the valve plug (key 4), and install the valve plug spring (key 14), connector cap gasket (key 36), and connector cap (key 6) into the top of the diaphragm assembly connector.
6. Install the control spring (key 7), spring seat (key 8), spring case (key 2), and machine screws (key 17). After assembly, make sure of the proper control spring setting according to the Adjustment section, and remark the nameplate if necessary.

Types 1808 and 1808A

P590 Series Filter

This procedure is to be performed if it is necessary to clean or replace filter parts in a Type P593-1 or P594-1 filter assembly.

1. Remove the following as shown in Figure 5: filter body (key 1), machine screw (key 4), spring washer (key 6), gasket (key 7), two flat washers (key 5), and filter element (key 2).
2. Upon reassembly, one of the flat washers must go between the filter element and filter head (key 3), and the other must go between the filter element and gasket.
3. Use pipe thread sealant on the filter head pipe threads.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment serial number or FS number that can be found on the nameplate.

When ordering replacement parts, reference the 11-character key number of each needed part as found in the following parts list. Separate kits containing all recommended spare parts are available.

Parts List

Main Valve Types 1808 and 1808A

Key	Description	Part Number
	Parts Kit (includes keys 3, 9, 10, 11, 19, and 21)	R1808X00012
1	Upper Casing, Steel	25A7831X012
2	Lower Casing, Steel	25A7828X012
3*	Diaphragm Assembly, Nitrile (NBR)	10A0288X012
4	Upper Diaphragm Plate, Zinc-plated steel	15A7834X012
5	Lower Diaphragm Plate, Zinc-plated steel	14A9681X012
6*	Valve Plug, Stainless steel	15A7826X012
7	O-Ring Retainer, Steel	15A7827X012
8	Body	
	Type 1808	
	Cast iron	25A7830X012
	WCC Steel, NACE	25A7926X022
	Type 1808A, Cast iron	37A7694X012
9*	O-Ring, Nitrile (NBR)	15A8508X012
10*	O-Ring, Nitrile (NBR)	1C628006992
11*	O-Ring, Nitrile (NBR)	1F358106992

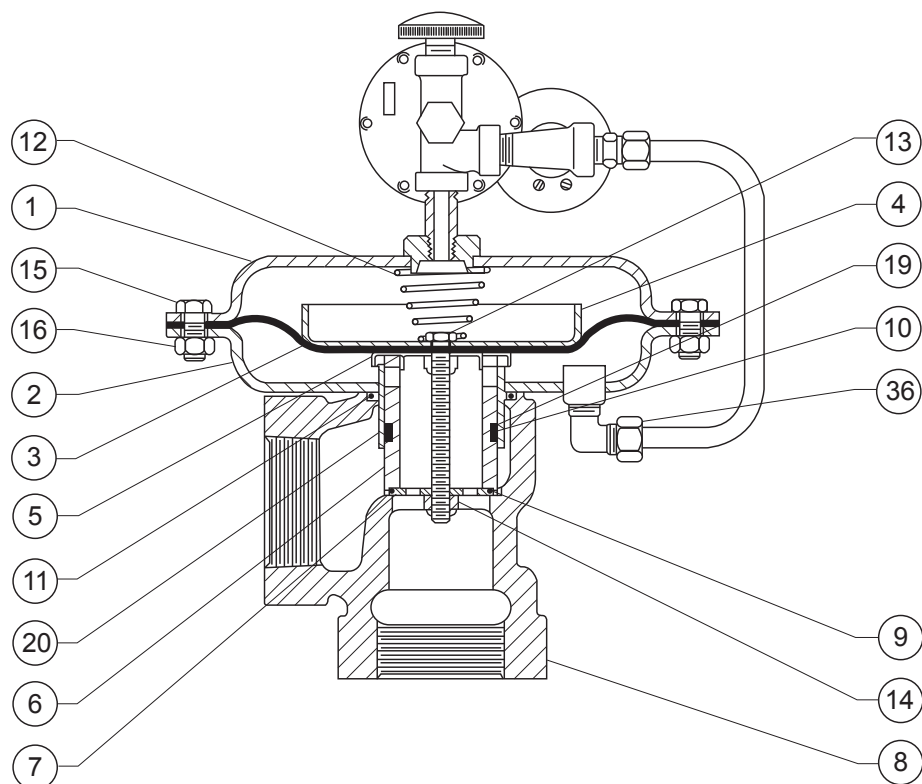
Key	Description	Part Number
12	Spring, Zinc-plated steel	15A8775X012
13	Cap Screw, Zinc-plated steel	15A7839X012
14	Hex Nut, Steel (2 required)	1V136228982
15	Cap Screw, Zinc-plated steel (12 required)	1E760324052
16	Hex Nut, Zinc-plated steel (12 required)	1A346524122
17	Cap Screw, Zinc-plated steel (2 required)	
	Type 1808	15A7835X012
	Type 1808A	17A9766X012
18	Hex Nut, Zinc-plated steel (2 required)	1E944524112
19*	Back-up Ring,	
	Polytetrafluoroethylene (PTFE) (2 required)	1U529406992
20	Valve Plug Guide, Stainless steel	15A7832X012
21*	Gasket, Nitrile (NBR) (2 required)	15A7836X012
36	Elbow	
	Copper Tube	-----
	Steel Tube	-----
	Stainless steel	-----
36	Pipe Plug, Steel (with upstream registration)	-----

Pilot Mounting Parts

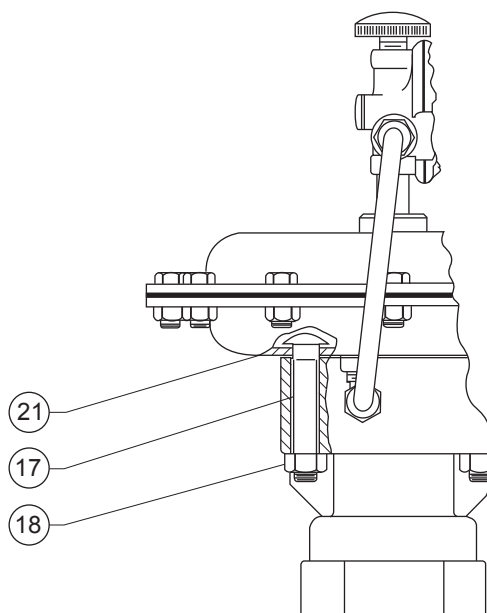
Key	Description	Part Number
21	Filter	
	Standard, Brass	Type P594-1
	Corrosive, Aluminum	Type P593-1
	Corrosive (NACE), Brass	Type P593-1
22	Pipe Nipple	
	Galvanized steel (standard)	-----
	Zinc-plated steel (NACE)	-----
24	Pipe Tee	
	Malleable iron (standard)	-----
	316 Stainless steel (NACE)	-----
25	Connector Fitting, Without upstream registration	
	Without Filter	
	Steel (standard)	-----
	316 Stainless steel (NACE)	-----
26	Elbow Fitting, Without upstream registration	
	With Filter	
	Standard	-----
	316 Stainless steel (NACE)	-----
27	Vent Assembly	Type Y602-11
28	Tubing,	
	316 Stainless steel (without upstream registration)	-----
29*	Gauge, 0 to 160 psig/0 to 11,0 bar/0 to 1,1 MPa	11B8579X042
29	Pipe Plug	
	Zinc-plated steel (NACE)	-----
	316 Stainless steel (NACE)	-----

*Recommended spare part

Types 1808 and 1808A



47A7696-A



47A7696-A

Figure 3. Type 1808A Assembly

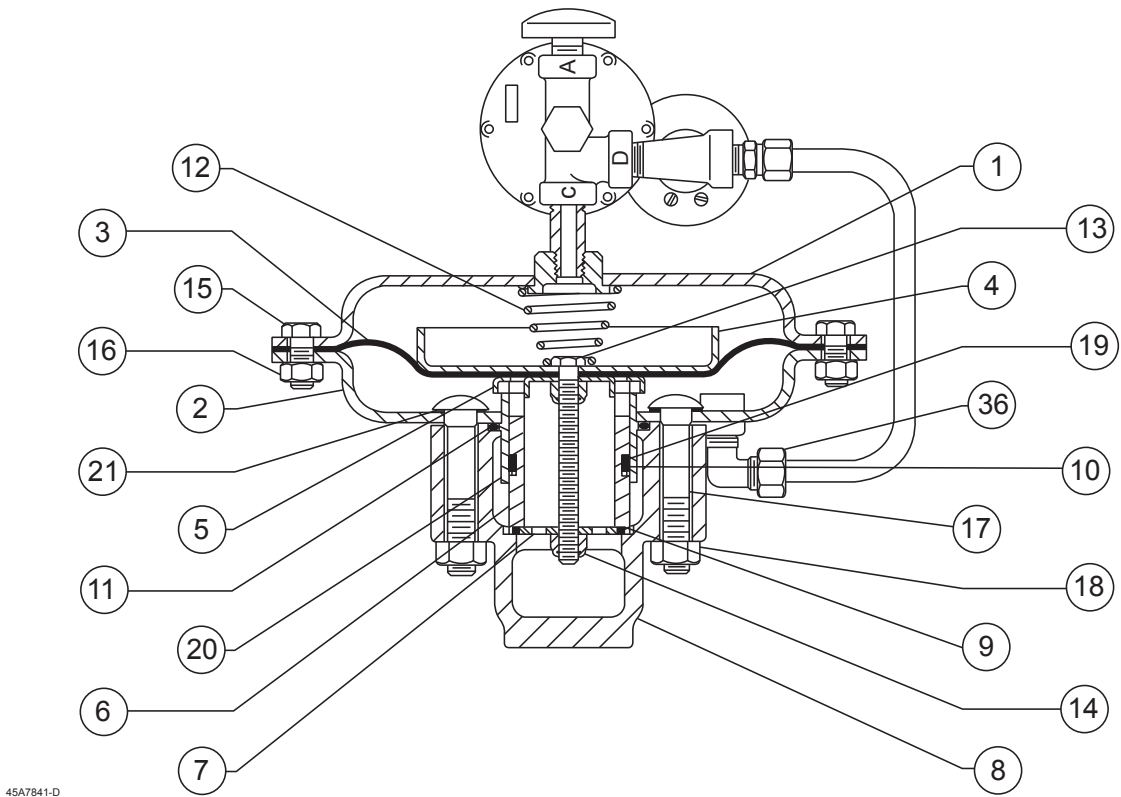


Figure 4. Type 1808 Assembly

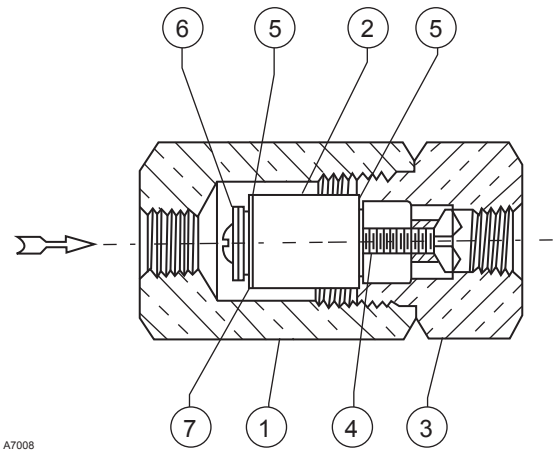


Figure 5. P590 Series Filter Assembly

Types 1808 and 1808A

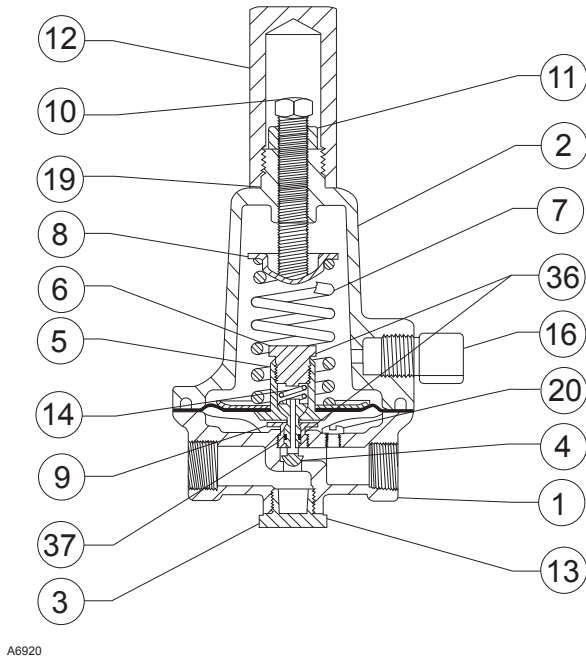
P590 Series

Key	Description	Part Number	Key	Description	Part Number
1	Filter Body		6	Connector Cap	
	Type P594-1, Brass	1E312414012		18-8 Stainless steel	16A2921X012
	Type P593-1 (NACE), Aluminum	1E3124X0022		316 Stainless steel	16A2921X022
2*	Filter Element, Cellulose	1E312606992	7	Spring	
3	Filter Head			3 to 18 psig (0,21 to 1,2 bar), Green	1B986027212
	Type P594-1, Brass	1E312514012		15 to 40 psig (1,0 to 2,8 bar), Yellow	1E392527022
	Type P593-1 (NACE), Aluminum	1E3125X0022		35 to 125 psig (2,4 to 8,6 bar), Red	1K748527202
4	Machine Screw		8	Spring Seat, Steel	1B798525062
	Type P594-1, Brass	1J500218992	9	Stem Guide	
	Type P593-1 (NACE), Aluminum	1J500209012		416 Stainless steel (standard)	16A2923X012
5	Washer, 2 required			174 Stainless steel	16A2923X022
	Type P594-1, Brass	1J500018992	10	Adjusting Screw, Zinc-plated steel	10B7192X012
	Type P593-1, Aluminum	1J500010062	11	Locknut, Steel	1A946324122
6*	Spring Washer, Steel	1H885128982	12	Closing Cap	
7*	Gasket, Composition	1F826804022		Plastic	23B9152X012
12	Seal Wire,			303 Stainless steel	1H2369X0032
	304 Stainless Steel (for Type P593-1, NACE only)	1U7581X0022	13*	Body Plug Gasket, Composition	1C495704022

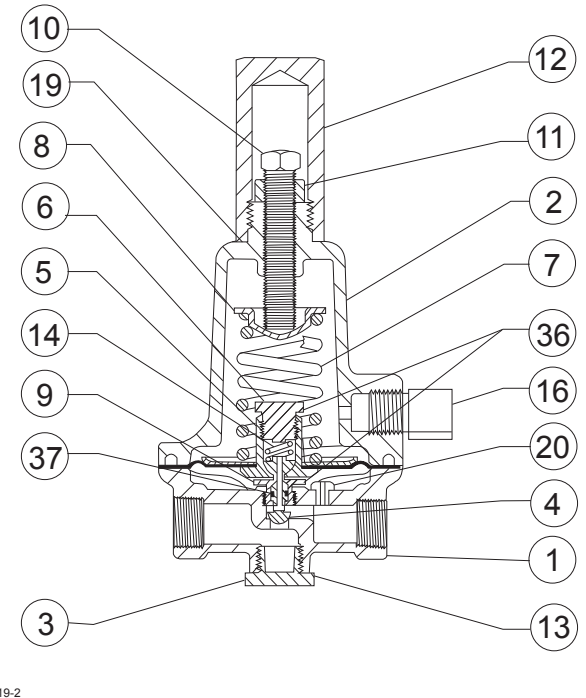
Types 6358 and 6358B Pilots

Key	Description	Part Number	Key	Description	Part Number
1	Body		16	Vent Assembly (2 required)	Type Y602-12
	CF8M Stainless steel	39A5972X012	17	Machine Screw, (6 required)	
	Aluminum	39A0138X012		Stainless steel	10B6189X022
2	Spring Case			Steel	1V4360X0022
	316 Stainless steel	28A9277X012	20	Restriction	
	Aluminum	25A6220X012		Type 6358	
3	Body Plug			Steel	1A346128982
	316 Stainless steel	1B797535072		Stainless steel	1V7435X0012
	Aluminum	1B797509032		Type 6358B	
4*	Valve Plug			High-Gain, Yellow	
	303 Stainless steel/Nitrile (NBR) (standard)	14B6372X012		Steel	17A7279X012
	UHMWPE	16A2924X012		Stainless steel	17A7279X032
5*	Diaphragm Assembly		20*	Restriction	
	Steel / Nitrile (NBR) (standard)	15A6216X072		Type 6358B	
	Steel / Neoprene (CR)	15A6216X212		Medium-Gain, Steel, Red	17A2029X012
	Steel / Fluorocarbon (FKM)	15A6216X172		Low-Gain, Steel, Blue	17A7277X012
	Steel / Nitrile (NBR) (for Type 6358B only)		36*	Gasket, Fluorocarbon (FKM), (2 required)	1U1716X0012
	2 to 10 psig (0,14 to 0,69 bar)	15A6216X182	37*	O-ring	
				Nitrile (NBR)	16A2920X012
				Fluorocarbon (FKM)	16A2920X022

*Recommended spare part.
Inconel® is a marked owned by Special Metals Corporation



TYPE 6358 PILOT INTERIOR VIEW



TYPE 6358B PILOT INTERIOR VIEW

Figure 6. Types 6358 and 6358B Pilot Assemblies

Types 1808 and 1808A

Industrial Regulators

Emerson Process Management Regulator Technologies, Inc.

USA - Headquarters
McKinney, Texas 75069-1872 USA
Tel: 1-800-558-5853
Outside U.S. 1-972-548-3574

Asia-Pacific
Shanghai, China 201206
Tel: +86 21 2892 9000

Europe
Bologna, Italy 40013
Tel: +39 051 4190611

Middle East and Africa
Dubai, United Arab Emirates
Tel: +971 4811 8100

Natural Gas Technologies

Emerson Process Management Regulator Technologies, Inc.

USA - Headquarters
McKinney, Texas 75069-1872 USA
Tel: 1-800-558-5853
Outside U.S. 1-972-548-3574

Asia-Pacific
Singapore, Singapore 128461
Tel: +65 6777 8211

Europe
Bologna, Italy 40013
Tel: +39 051 4190611
Gallardon, France 28320
Tel: +33 (0)2 37 33 47 00

TESCOM

Emerson Process Management Tescom Corporation

USA - Headquarters
Elk River, Minnesota 55330-2445 USA
Tel: 1-763-241-3238

Europe
Selmsdorf, Germany 23923
Tel: +49 (0) 38823 31 0

For further information visit www.fisherregulators.com

The Emerson logo is a trademark and service mark of Emerson Electric Co. All other marks are the property of their prospective owners. Fisher is a mark owned by Fisher Controls, Inc., a business of Emerson Process Management.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

Emerson Process Management does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any Emerson Process Management product remains solely with the purchaser.